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On the Relative Prevalence of Diseases in Hull, and the Effects of Season upon Disease. By HENRY COOPER, M.D.

[Read before the Statistical Section of the British Association, at Hull,
9th September, 1853.]

BEFORE entering on the special subject of this essay, I wish to say a few words on the annual rate of mortality of the borough.

In assigning a rate of mortality to Hull, it has been the practice of the Registrar-General to separate the returns of death in different parts of the borough, and give them under several distinct heads; and the same mode of stating the mortality has been adopted in all observations and calculations founded on these reports.

The mortality of the borough is given under the several heads, "Hull," including the town and the two Mytons; "Sculcoates," including the two registration districts of that name; and "Sulton," "Drypool," and "Southcoates," parts only of which districts are included within the limits of the borough. But as the town is known only as "Hull," the mortality of the portion included under that term is assumed by the public as the mortality of the whole, an error of some importance, as leading to a very exaggerated estimate of the rate of mortality. For the district thus designated as "Hull," includes little more than half the borough, and comprises the most densely populated parts, at the lowest levels, and the least favourably circumstanced as regards hygienic conditions. It contains, besides the general hospital, the gaol and the workhouse. Hence, its mortality is disproportionately high; it is stated in the Registrar-General's Reports, on an average of seven years, terminating 1846, to be 1 death in 33, or 3·008 per cent. of all ages. The infant mortality, now generally accepted as the most sensitive test of the force of morbid influences, ranges also very high; it is, on an average of the same period, 29·026 per cent. annually, under 1 year, and 10·184 per cent. under 5 years. But in Sculcoates, we have a mortality of only 1 in 40 males, and 1 in 44 females; or 2·487, and 2·240, per cent. respectively, instead of 3·008, as just quoted for the other portion of the borough. The infant mortality of Sculcoates is 26·886 under 1 year, and 8·617 under 5, against 29·026 and 10·184 in Hull. The mortality of the other parts of the borough, east of the river, cannot, from being included in the parishes and townships of which they respectively form a part, be obtained from the Registrar's Reports, or any other official documents. Their hygienic condition is deplorably bad; the mortality is intermediate between that of Hull proper, and Sculcoates, being 2·47 per cent. Thus it is clear that, in assuming the mortality of the Hull district alone to be that of the whole borough, we attribute to the whole the rate of the most unhealthy portion only.

The mortality of the three years succeeding to 1846, though not so favourable to the borough generally, exhibits the same difference between its different parts. The Hull district had 1 death to 29 living; the Sculcoates, 1 to 37; and, in West Sculcoates, the most healthy, 1 to 42;—the average of the whole borough being 1 to 33·17.

The mortality due to the epidemic of 1849 has been made the subject of a separate memoir. For the three subsequent years it

stands as follows :—The population at the census of '51 was 82,502 ; taking this as the mean of the number living in the three years, '50, '51, '52, we have a mortality for the whole borough for that period of 1 to 32·79, the average number of deaths being 2,522 ; and the returns of the two first quarters of the present year raise the rate again to something above 1 to 33 for the whole borough.

In investigating the question, which is the proper subject of my paper, viz., the order of prevalence of disease in Hull, *irrespective of fatal issue*, we have not the ready data furnished by the Registrar's reports, or by any official local record, for our guidance. The medical charities of the town have, however, for a greater or less period, and with more or less exactness, recorded the name, ages, and diseases of applicants for relief ; and it is from their books that the tables now before us have been compiled. In the first table are classified 21,712 cases from the books of the infirmary and dispensary of this town ; extending over a period of 10 years in the former institution, and of 3 in the latter. The sources from which the cases have been derived (*i. e.*, the out or in patients) have been separated, as indicating different classes of cases as well as intensity of disease. The cases have, in this table (A), been further analysed into years, shewing what diseases are liable to assume an epidemic character, and in what years they have done so—thus, fever was prevalent in 1840 ; rheumatism in 1842 and '46, &c., &c. The cases are classified in eight divisions, which show, at a glance, the great tendency to pulmonary, rheumatic, and dyspeptic disorders ; and the comparative exemption from fever, from which Hull suffers, perhaps, less than any other town of its size. This is the more remarkable, as we have had too fatal evidence that the town is liable to those epidemic influences which have always been considered closely analogous to fever in their laws of origin and propagation. The proclivity to pulmonary and rheumatic diseases will excite no surprise when the geographical position of the town, and the large quantity of water by which it is surrounded and intersected, are considered. It will not be necessary that I should particularize the other less prevalent diseases : the last column of this table is, however, remarkable, as indicating a much less amount of susceptibility of the alimentary mucous surfaces under ordinary conditions than would have been anticipated.

I have been compelled to omit from the enumeration the zymotic diseases generally, because they are specially excluded from the hospital treatment, and only casually become dispensary cases. Their number, as recorded in these books, is, therefore, so small as to give a most inadequate representation of this most important and numerous class of diseases. In Table A, the relative prevalence of each form of disease is indicated by its per-centage of the *whole number of cases observed*, which is placed at the foot of each column respectively. The totals, with their proportion per cent. to the whole observed cases, appear in the lowest line of the table ; to them I would direct attention, as illustrating the above remarks.

A diagram* has been compiled from the whole series of 21,702 cases, extending over 10 years, and may, therefore, be presumed to give a tolerably near approximation to truth. We remark the high

* Want of space precludes the possibility of printing this diagram.

TABLE showing the Relative Prevalence of Different Diseases in Hull, the Prevalence of each Disease in different Years, and Proportion Per Cent. of each Disease to whole Number of Cases observed.

Return for 10 Years.	Total Cases.	Fever.	Pulmonary Disease.	Rheumatism.	Dyspepsia.	Neurosis.	Uterine.	Cachexia.	Diarrhoea.
Infirmary. O. P.	1842.....	63	187	102	207	167	59	37	33
	1843.....	34	196	72	192	116	85	23	24
	1844.....	28	188	79	193	141	81	88	24
	1845.....	16	168	58	104	58	49	49	18
	1846.....	53	111	105	203	60	65	42	33
	1847.....	53	155	87	197	53	44	39	23
	1848.....	75	123	69	204	61	84	52	38
	1849.....	35	139	74	162	56	58	53	33
	1850.....	45	161	82	143	78	60	59	27
	1851.....	41	160	80	159	82	73	53	30
Total per cent.	13,891	443 3·19	1,588 11·43	808 5·81	1,764 13·00	904 6·50	698 5·02	495 3·56	283 2·03
Infirmary. I. P.	1849.....	57	65	74	19	12	19	22	10
	1850.....	34	50	73	21	29	20	21	9
	1851.....	44	82	75	13	27	27	19	7
	Total per cent.	135 6·00	197 8·66	222 9·76	53 2·33	68 3·00	66 2·9	62 2·72	26 1·14
Dispensary.	1849.....	178	190	131	147	108	68	32	100
	1850.....	149	213	125	153	90	81	32	99
	1851.....	231	314	111	163	114	69	38	114
	Total per cent.	558 10·05	717 12·92	367 6·61	463 8·34	312 5·62	218 3·93	102 1·83	313 5·61
Grand Total—10 years Per cent.	21,712	1,136 5·23	2,502 11·52	1,397 6·43	2,280 10·5	1,284 5·88	982 4·52	659 3·03	622 2·86

point at which pulmonary diseases start at the commencement of the year, and which they maintain, with slight fluctuations, till the end of May, when they fall very rapidly to the minimum, in August, and rise again equably through the autumn months to the winter level in December. Dyspepsia begins low in the winter, runs rapidly to its culminating point in May, in which it coincides with pulmonary affection; it attains, however, a much greater height than the latter, and then falls rapidly through the autumn, finishing at the medium winter level. Rheumatism has its maximum in winter, with an exacerbation in August and November, which coincides well with actual observation; it takes a rapid rise from December to January. Fever maintains the most equable course of the four curves; it also culminates in May (which should, so far as these three diseases are concerned, be a very unhealthy month), has a sudden depression in July, rises above the level in the autumn months, and again sinks to the winter level in December.

I believe that these results correspond accurately with the experience of practical men in this town, both as to the relative prevalence of diseases and the seasons at which their greatest developments take place; and it is a satisfaction to have confirmation and exactness given to practical views by the application of the numerical method.

A few words on two or three important forms of disease, our records of which do not furnish materials for numerical illustration. Ague was, 25 years ago, very frequently seen in our hospital, the cases being principally supplied from the low wet clays of Holderness and the fens of Lincolnshire. For 10 or 15 years, however, ague has been a rare disease, a fact which was attributed, no doubt correctly, to the greatly improved drainage of both these districts, particularly of Holderness, in which a very complete system has been carried out.

But we have remarked, within the last year or two, that these cases have ceased to be uncommon; and that there has been a great disposition, in certain depressed states of the system, to take on an intermittent character of disease. And, what is still more singular, I have succeeded in tracing several cases, within the last few months, to their origin in the *badly drained portions of the borough itself*, individuals, who have not been out of the town for many months, having been attacked, and resisting treatment for a time, as if still under the influences which produced the disease. Is it possible that the town is now more saturated with moisture than the country district? And if so, of what character must that moisture be, with what materials charged, and what the nature of exhalations from it?

An examination made by me in 1845, at the request of Mr. B. Phillips, who was then preparing his work on Scrofula, showed a very large per-centage of children exhibiting marks of that disease frequenting the public schools of the town, and generally of the lower orders. I regret that I have not the papers by me, but I believe that they indicate a prevalence above the average given by Mr. Phillips, *viz.*, $24\frac{1}{2}$ per cent.
